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PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Applicant: ALLEN et al.

Application: STORAGE AREA NETWORK MANAGEMENT AND CONFIGURATION METHOD AND APPARATUS VIA ENABLING IN-BAND COMMUNICATIONS

Serial No.: 09/657,234

Filing Date: September 7, 2000

Art Unit: 2143

Examiner: David E. England

Case: ROC92000-0220-US1

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Unit 1804
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APPEAL BRIEF TRANSMITTAL

Sir:

An Appeal Brief for Applicants is being submitted herewith. Please charge the Deposit Account No. 09-0465 of International Business Machine Corporation in the amount of **$500.00** for the fee for filing a brief in support of the appeal (37 CFR §41.20(b)(2) fee code 1402).

The Commissioner of Patents and Trademarks is hereby authorized to charge any additional fees or credit any overpayment in connection with the filing of the above-referred to Appeal Brief to the Deposit Account No. 09-0465 of International Business Machine Corporation. A duplicate copy of this transmittal is enclosed.

Respectfully submitted,

By Joan Pennington

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One of the Attorneys for Applicants

Enclosures

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APPEAL BRIEF FOR APPLICANTS

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APPEAL BRIEF FOR APPLICANTS

Sir:

This is an appeal of the final rejection of claims 1-4, 6, and 8-18 under 35 U.S.C. §103(a) mailed February 8, 2006. For the reasons set forth below, it is submitted that the Board should reverse the final rejection of claims 1-4, 6, and 8-18.

(1) REAL PARTY IN INTEREST

The real party of interest is International Business Machines Corporation.

(2) RELATED APPEALS AND INTERFERENCES

Applicants' attorney knows of no other appeals or interferences that would have a bearing on the Board's decision in the present appeal.

(3) STATUS OF CLAIMS

Claims 1-4, 6, and 8-18 have been finally rejected as unpatentable under 35 U.S.C. § 103(a) in an office action mailed February 8, 2006, and that was maintained in an Advisory Action mailed May 15, 2006. The rejections of each of the pending claims 1-4, 6, and 8-18 have been appealed.

(4) STATUS OF AMENDMENTS

An amendment was filed on March 31, 2006 after the final rejection of claims and will be entered for purposes of appeal.

(5) SUMMARY OF CLAIMED SUBJECT MATTER

The claimed invention as recited by independent claims 1, and 11 and representative dependant claims 8, 9, and 13 can best be appreciated and understood with reference to the patent specification (hereinafter page p., line l.) and drawings of the invention, attached in (9) Evidence Appendix (Sheets 1-3).

Problems exist in known storage area network arrangements. For example, some known storage area network arrangements, such as in a serial storage architecture (SSA), device driver writers and host based adapter (HBA) vendors provide

a complex set of micro code calls. A management program would then interrogate the HBA, using micro code calls specific to the particular HBA vendor and model, then interpret the results in a way that is specific to that particular HBA vendor and model. One problem with this arrangement is that an in-depth understanding is needed for every HBA model of every vendor, which in the case of Fibre Channel, is impractical. There are too many vendors and too many models to implement this approach. Another problem is that certain HBA models from certain vendors simply cannot support the necessary micro code calls to enable the devices to be managed, and thus prohibiting a SAN management program from working with these devices. (p. 1, l. 5-23, p. 2 l. 1-4)

The present invention effectively implements a mechanism for communicating with devices in-band or over a fibre cable, allowing maximized flexibility, in a vendor and device independent manner. (p. 2, l. 6-12)

As recited in independent claim 1, a storage area network (SAN) management and configuration method via enabling in-band communications comprising the steps of: utilizing a SAN management application for managing and configuring the storage area network; said SAN management application communicates with at least one SAN-connected host system and communicates with a host bus adapter (HBA) device driver, and providing a pass through in said HBA device driver for passing communications to a designated device in the storage area network from said SAN management application including at least one topology analysis command; said at least one topology analysis command including a command to get interconnect

information and a command to get topology information; and providing said pass through includes providing at least a transport pass through and an extended link service (ELS) pass through; each of said transport pass through and said extended link service (ELS) pass through being a binary pass through, each taking applied commands and passing said commands to said designated device in the storage area network. (p. 2, l. 13-28).

As recited in independent claim 11, a storage area network (SAN) management and configuration apparatus via enabling in-band communications comprising: a storage area network (SAN) management application for managing and configuring the storage area network; said SAN management application communicates with at least one SAN-connected host system; said SAN-connected host system including a management application agent for communicating with a host bus adapter (HBA) device driver; said HBA device driver for communicating with a designated device in the storage area network; said HBA device driver including at least one pass through service for passing a plurality of commands to said designated device in the storage area network; said commands including at least one topology analysis command; said at least one topology analysis command including a command to get interconnect information and a command to get topology information; said at least one pass through including a transport pass through and an extended link service (ELS) pass through; each of said transport pass through and said extended link service (ELS) pass through being a binary pass through, each taking applied commands and passing said commands to the designated device in the storage area network. (p. 2, l. 13-28).

In accordance with features of the invention, management application agent provides predefined, fibre channel standard, protocol functions for communicating with the device in the storage area network. The predefined protocol functions include a common transport (CT) protocol function and the extended link service (ELS) protocol function. (p. 2, l. 29 - p. 3, l. 2).

As set forth in dependent claims 8 and 9, providing said pass through in said host bus adapter (HBA) device driver for passing communications to a device in the storage area network from said SAN management application includes the step of providing said pass through for passing a plurality of commands, including passing at least one performance analysis command (claim 8) and passing at least one attribute analysis command (claim 9). (p. 4, l. 21-27). As set forth in dependent claim 13, the said at least one pass through service bypasses said HBA device driver interface and a plurality of layers of said fibre channel hierarchy. (p. 6, l. 8-14)

In FIG. 1, there is shown a storage area network (SAN) system for implementing methods for enabling in-band communications in accordance with the preferred embodiment generally designated by the reference character 100. As shown in FIG. 1, SAN system 100 includes a SAN management application 102 coupled to a SAN connected host system 104 by a communications link 105. SAN connected host system 104 includes an operating system 106 and a management application agents 108 coupled to the SAN management application 102 and a host bus adapter (HBA) device driver 110. Typically SAN management application 102 is remotely coupled to multiple management application agents 108 on multiple SAN connected host systems

104. (p. 3, l. 19-30)

HBA device driver 110 includes a common transport (CT) pass-through 112, an extended link service (ELS) pass-through 114 and a small computer system interface (SCSI) protocol driver 116. The CT pass-through 112 and the ELS pass-through 114 are coupled to the management application agents 108 that provides the CT protocol and ELS protocol communications functions. The SCSI protocol driver 116 is coupled to the host operating system 108 for conventional flow control of data. HBA firmware 118 and HBA hardware 119 is coupled between the HBA device driver 110 and a storage area network (SAN) 120. SAN 120 includes a fibre channel (FC) fabric and link services 122. The CT pass-through 112 and the ELS pass-through 114 are binary pass-throughs that each takes applied commands and passes the received commands to the SAN 120. CT operations from the management application agents 108 to the FC fabric and link services 122 are indicated by dotted lines. ELS operations from the management application agents 108 to the FC fabric and link services 122 are indicated by dashed lines. A SCSI storage device 124 is shown associated with the SAN cloud 120. FC fabric and link services 122 include multiple switches and hubs for connection of a plurality of FC devices 126 (one shown). FC fabric and link services 122 receive commands from the HBA firmware 118, HBA hardware 119 and sends data back via the HBA firmware 118, HBA hardware 119. (p. 4, l. 1-20)

In accordance with features of the preferred embodiment, SAN management application 102 prepares a variety of commands at different levels of fibre channel specification, for example, CT and ELS commands. The SAN connected host system

104 communicates with the management application agents 108 which communicates with the HBA device driver 110 and HBA firmware 118, HBA hardware 119, which communicates with devices 126 in the SAN cloud 120. (p. 4, l. 21-27)

In accordance with features of the preferred embodiment, in the SAN connected host system 104, the HBA device driver 110 and HBA firmware 118, HBA hardware 119 support the CT pass-through 112 and the ELS pass-through 114, such that a variety of commands, at different levels of the fibre channel specification, for example CT and ELS protocols, are prepared by the SAN management application agent 108, and passed via the HBA device driver 110 including the CT pass-through 112 and the ELS pass-through 114 and HBA firmware 118, HBA hardware 119 to a designated device where the commands are executed. As a result the problem of requiring micro code specific to multiple vendors is avoided. A reply can be generated on the device, and that reply returns to the SAN management program 102 via the same path of the commands. (p. 4, l. 28- p. 5, l. 4)

In accordance with features of the preferred embodiment, the SAN connected host system 104 including the HBA device driver 110 and HBA firmware 118, HBA hardware 119 supporting the CT pass-through 112 and the ELS pass-through 114 allow several kinds of commands to be issued. For example, the commands include topology analysis commands, such as what is connected to what, and in what zone, and the like. The commands include performance analysis commands, such as access frame counters, data volume and the like. The commands include attribute analysis commands, such as disk drive number of blocks in use or free. The commands include

configuration commands, such as to bring disks on or off line, swap spare disks, archive data, move disks between SAN zones, and the like. (p. 5, l. 5-15)

Referring now to FIG. 2, there is shown a logical sequence diagram illustrating SAN discover using the CT pass-through 112 and the ELS pass-through 114 services. SAN management program 102 issues a discover command to management agents 108 indicated at a line labeled DISCOVER. Management agents 108 issues commands to the HBA device driver 110 indicated at lines labeled CT: GET INTERCONNECTS; CT: GET TOPOLOGY INFO; ELS: GET FC NODE INFO; SCSI INQUIRY; SCSI READCAPACITY; and SCSI GETLUNs (get logical unit numbers). Via pass-throughs 114, 116 commands are issued to the fabric and link services 122 indicated at lines labeled (GET INTERCONNECTS); (GET TOPOLOGY INFO); the command (GET FC NODE INFO) is issued to the SCSI storage devices 124 and (GET FC NODE INFO) is issued to the FC device 126. SCSI commands are issued to the storage devices 124 indicated at lines labeled EXECUTE SCSI INQUIRY; EXECUTE SCSI READCAPACITY; and EXECUTE SCSI GETLUNs. (p. 5, l. 16-30)

Referring now to FIG. 3, there is shown the storage area network (SAN) 120 with FC devices 126, a fibre channel hierarchy 300 and the management application agent 108 together with the pass-through services 112, 114 in accordance with the preferred embodiment. The fibre channel hierarchy 300 includes from a lower layer to a top layer, a media 302 or wire or optical cable layer coupled to the SAN 120, a physical interface 304, a transmission protocol 306, the fabric and line services 122, common services 308, an upper level protocol (UPL) mapping 310, and the SCSI protocol driver

116. A standard HBA device driver interface 310 is coupled to the SCSI protocol driver 116. The management application agent 108 is coupled to the standard HBA device driver interface 310 and the pass-through services 112, 114. As shown in FIG. 3, the pass-through services 112, 114 in accordance with the preferred embodiment allows bypassing of the standard HBA device driver interface 310 and the upper fibre channel layers including the SCSI protocol driver 116, the upper level protocol (UPL) mapping 310, and the common services 308. The pass-through services 112, 114 passes commands received from the management application agent 108 directly to the fabric and link services 122. (p. 5, l. 31 - p. 6, l. 14)

(6) GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

The grounds of rejection presented for review include:

The rejection of claims 1-4, 6, 10-14 and 15-18 under 35 USC §103(a) as being unpatentable over Kelman, U.S. patent 6,671,820 in view of Stai et al., U.S. patent 6,401,128 and further in view of Haren, U.S. patent 6,557,060, and further in view of newly cited Fredericks et al., U.S. patent 6,347,334.

The rejection of claims 8, and 9 under 35 USC §103(a) as being unpatentable over Kelman, U.S. patent 6,671,820 in view of Stai et al., U.S. patent 6,401,128 and Haren, U.S. patent 6,557,060 and Fredericks et al., U.S. patent 6,347,334, and further in view of Panas et al., U.S. patent 6,473,857.

(7) ARGUMENT

A. INTRODUCTION

The claims 1-4, 6, and 8-18 on appeal do not all stand or fall together. The claims may conveniently be considered based upon subject matter with each of the independent claims 1, and 11, and representative dependent claims 8, 9, and 13 being separately patentable.

Applicants respectfully submit that the Examiner's rejections under 35 U.S.C. § 103(a) should be reversed because the subject matter of each of independent claims 1, and 11 is patentable over all the references of record. There is no teaching or suggestion in any of the cited references, individually or taken as a whole, to make the claimed invention obvious. The rejections of claims 1-4, 6, and 8-18 under 35 U.S.C. §103(a) are improper and should be reversed.

B. THE SCOPE AND CONTENT OF THE PRIOR ART

Kelman, U.S. patent 6,671,820 discloses a system and method for preventing the corruption of networked storage devices during the process of transferring backup data to a server on the network that has suffered data loss as the result of a disaster.

Column 3, line 51 - column 4, line 2 states:

> The system and method described include a SCSI logical unit number (LUN) masking driver. The LUN masking driver is preferably contained on an emergency diskette that is to be used during the recovery process for loading vital device drivers onto the affected server so that the affected server may boot and connect to the SAN. During the recovery process, the LUN masking driver will load when the operating system boots up, after the SAN HBA driver loads and before the normal file systems load. The LUN masking driver scans all devices visible on the SAN and uses SCSI inquiry commands to determine which devices are dedicated backup storage devices. The LUN masking driver then masks all devices that are not dedicated backup storage devices. Thus, only dedicated backup storage devices are visible to software that boots up after the LUN masking driver completes its function. Consequently, the operating system's file systems never see the storage devices that are not dedicated backup storage devices. As a result, the affected server cannot access the storage devices and cause data corruption.

Column 6, line 63 - column 7, line 36 states:

> After the HBA and disk drivers have been loaded, the LUN masking driver loads onto the affected server at step 42. The LUN masking driver then issues a SCSI protocol inquiry of the devices on shared storage network 10. The SCSI protocol inquiry is intended to determine two things: first, whether the interrogated device is a SCSI device, and second, what type of SCSI device. When a SCSI type device receives a SCSI protocol inquiry, the SCSI device returns a signal to the device or software that issued the inquiry. This signal returned by the SCSI device includes peripheral-type information that identifies the device type. For example, if the SCSI device is a tape storage device, the peripheral-type information will identify the SCSI device as a tape storage device. At step 44, the LUN masking driver receives the peripheral-type information from the SCSI devices on shared storage network 10. For example, if the LUN masking driver issues a SCSI protocol inquiry of the devices in shared storage network 10, then storage devices 24, dedicated backup storage devices 28, and any other SCSI device comprising computer network 14 will return a signal to the LUN masking driver that contains peripheral-type information. The peripheral-type information sent by storage device 24 will include information identifying the storage device 24 as a hard disk drive, for example, and may include specific information such

as the manufacturer, make, or model of storage device 24. The dedicated backup storage devices 28 will return similar information to identify its device type, i.e., a tape drive. Once the LUN masking driver has received the peripheral-type information, the LUN masking driver will be able to identify what SCSI devices on shared storage network 10 are dedicated storage devices 28.

At step 46, the operating system loads. When the operating system initially loads onto the affected server, the operating system will communicate with the disk driver to identify the storage devices 24 that are located on the shared storage network 10. Accordingly, at step 48a, the operating system issues a command to identify all of the available LUNs on the storage network 10. Unless the LUNs are masked, the disk driver will respond with all of the LUN addresses which will create the risk of data corruption.

Stai et al., U.S. patent 6,401,128 discloses a system and method for sending frames between a public device and a private device that comprise a phantom device mapping, an address translation, a frame payload translation, and a CRC regeneration. The system and method assign a phantom AL_PA for the public device and establishes a phantom device mapping between the phantom AL_PA and the public device's Port_ID. With the phantom device mapping, the disclosed system directs all communication between the public device and the private loop device as if the communication were between a phantom device and the private device. Specifically, the system and method comprise a public-to-private address translation in one direction and a private-to-public address translation in the other direction. During the public-to-private address translation process, the source address of the frame is converted to a phantom AL_PA. The public-to-private address translation uses a Port_ID to phantom AL_PA mapping table and finds an entry where the Port_ID matches the source address. The public-to-private address translation replaces the source address of the

frame with the phantom AL_PA of the matched entry, and the destination address with the AL_PA only of the destination device. The private-to-public address translation replaces the destination address of the frame with the Port_ID of the matched entry, and the source address with the fabric assigned address of the private device. As set forth at column 6, starting at line 25:

Every frame between public device 106A and private loop device 110E requires an address translation, either a public-to-private or a private-to-public address translation. In addition, if the frame content (called payload) contains any address information, it is also changed accordingly. Typically, these types of frames are Extended Link Services (ELS) in Fibre Channel, and they are either ELS request or response frames. FIG. 4 is a functional block diagram of a preferred embodiment of an ELS request payload translation. An ELS request payload translation process is required if the source address and/or the destination address of a frame being transmitted between a public device and a private device are part of the payload. An ELS request payload translation may be performed during a public-to-private translation or during a private-to-public translation. During the ELS request payload translation process, the frame type and Extended Link Services command code are examined to determine if payload translation is required. These are examined using an ELS request payload table which stores information on the frame type, command codes, and the information of fields to be modified. If payload translation is required, one or more fields in the frame payload is translated according to the ELS request payload table. If an ELS request payload translation is performed, the information for that frame is stored in a request payload cross-reference table. The request payload cross-reference table can then be used during an ELS response payload translation as described with reference to FIG. 5.

Haren, U.S. patent 6,557,060 discloses a host expansion bridge where data is converted from a first granularity to a second granularity different from the first granularity. The ratio "n" of the second granularity of the data to the first granularity of the data is determined as a power of 2. The least significant n bits of the beginning alignment of the data are added to the least significant n bits of the beginning count of the data, and the carry bit of the sum is designated as "c". A logical "OR" is performed of the bits of the resulting sum to obtain a value designated as "d". A number of data

units, equal to the sum of "c" and "d", is added to the data. Column 4, lines 1-28 states:

A software stack may be provided in channel adapter 119 or 119' to access the network switching fabric 100 and information about fabric configuration, fabric topology and connection information. The operating system software (OS) of the processing system 110 may include a fabric bus driver and a fabric adapter device-specific driver utilized to establish communication with a remote fabric-attached agent (e.g., I/O controller) of another processing system connected to the network, and perform functions common to most drivers, including, for example, host-fabric adapter initialization and configuration, channel configuration, channel abstraction, resource management, fabric management service and operations, send/receive I/O transaction messages, remote direct memory access (rDMA) data transfers (e.g., read and write operations), queue management, memory registration, descriptor management, message flow control, and transient error handling and recovery. Such a software driver module may be written using high-level programming languages such as C, C++ and Visual Basic, and may be provided on a tangible medium, such as a memory device, magnetic disk (fixed, floppy, and removable), other magnetic media such as magnetic tapes; optical media such as CD-ROM disks, or via Internet download, which may be available for a network administrator to conveniently plug-in or download into an existing operating system (OS). Such a software driver module may also be bundled with the existing operating system which may be activated by a particular device driver.

Fredericks et al., U.S. patent 6,347,334 discloses a method for implementing a link level service in a computer network having a first port device and a second port device. Node identification data is stored in the second port device. A physical-layer communications coupling is provided between the first port device and the second port device which may be a point-to-point, loop, or switched circuit connection. The first port device sends a request node identification (RNID) message addressed to the second port device. The second port device creates an accept message and copies stored node identification data into the accept message. The second port device sends the accept message to the first port device. Column 6, lines 9-44 state:

As described hereinbefore the RNID can optionally request node information from only nodes that support a specific FC-4 frame format (e.g., SCSI, SBCCS, and the like). In this way, the requesting device will not receive Accept message responses from

devices that are not of interest. The ELS implementation preferably allows that if the recipient device does not support the requested node-identification data format specified in the RNID message, it should reply with a "link service reject" (LS_RJT) ELS message with a reason code of "unable to perform command request" and reason-code explanation of "unable to supply requested data".

In a preferred implementation, a RNID message is sent by an N_Port to its nearest neighbor node. The node attached to the other end of the link is hereinafter referred to as the "nearest neighbor node" and may be a node port (N_Port) of another device or a fabric port (F_Port). It is permissible, however, for a node to request node-identification data from any other node in the fabric. If the nearest neighbor node has been determined from the fabric logon information (FLOGI) to be a fabric node, then the RNID ELS message is sent to the Fabric Controller at the address hex `FFFFFD` as is well known. If the nearest neighbor node has been determined from the FLOGI to be an N_Port, then the RNID ELS is sent directly to that N_Port identified by its address identifier.

The fabric may acquire the node-identification data for all nodes attached to a switch's E_Ports, FL_Ports, or E_Ports with the address identifier of the attached node. Multiple switches in the same fabric may acquire the node-identification data of the node attached to the other end of their inter-switch link (ISL). For node-identification data acquisition between E_Port nodes, each switch 106 and 107 may issue and respond to RNID ELS messages across the ISL using Class F service (i.e. the ELS inherently becomes a switch fabric internal link services (SW_ILS)).

Panas et al., U.S. patent 6,473,857 discloses a method for centralized and managed loading of boot images into one or more processors that are part of a file server for a mass storage system. In a computer system having at least one first controller, at least one input output processor (IOP), a first bus and a second bus, the present invention includes the steps of detecting readiness of the IOP to load a boot image, identifying across the first bus a location where the boot image will be loaded and loading the boot image across the second bus. The first controller may determine which of a plurality of boot images should be loaded. The first controller and the IOP may each have first and second processors, with communication between the first processors being across the first bus and boot images being accessed by the second

processors across the second bus. On the IOP, the first processor may control power to the second processor and may monitor the status of the second processor, reporting across the first bus to the first controller's first processor regarding the status of the IOP's second processor. The boot image may be copied to memory local to the IOP's second processor or it may be made available across the second bus. The boot image supplied may be adapted to normal, diagnostic, crash dump or other purposes. The progress of IOP booting is tracked and monitored. As stated at column 4, lines 36-61:

The connection options 130 are various methods of connecting servers and clients to the ISAN server 102A. The serial connections 140 support network management, modems for remote management, and uninterruptible power supply messages. The front panel connection 142 supports a management connection with the front panel display of the ISAN server 102A. The Ethernet connection 144 supports an Ethernet interface for management protocols and for data transfer. The network interface 146 is one of potentially many high speed interfaces on the server. In some embodiments, the network interface 146 is a fibre channel interface with drivers for a fibre channel arbitrated loop (FC-AL). The network interface 146 may also include drivers for SCSI-3 over the fibre channel medium using fibre channel protocol (FCP). The hardware interface 126 provides interface specific hardware components. For example, the network interface 146 has a network interface specific set of software modules to support configuration, diagnostics, performance monitoring, and health and status monitoring. The operating system 124, the tables 116, and the interfaces 118-122 support the virtual device and storage routing functionality of the ISAN server 102A. These components of the ISAN server 102A route storage transactions among appropriate storage options 128 and the connection options 130 using configured sets of driver modules in the system.

C. THE REJECTION OF CLAIMS 1-4, 6, 10-14, and 15-18 AS BEING UNPATENTABLE OVER KELMAN IN VIEW OF STAI et. al. IN FURTHER VIEW OF HAREN, IN FURTHER VIEW OF SHOULD BE REVERSED

The Board should reverse the rejection of claims 1-4, 6, 10-14 and 15-18 under 35 USC §103(a) as being unpatentable over Kelman, U.S. patent 6,671,820 in

view of Stai et al., U.S. patent 6,401,128 and further in view of Haren, U.S. patent 6,557,060, and further in view of newly cited Fredericks et al., U.S. patent 6,347,334.

Claim 1 is patentable

Independent claim 1 recites a storage area network (SAN) management and configuration method via enabling in-band communications. Independent claim 1 requires utilizing a SAN management application for managing and configuring the storage area network; said SAN management application communicates with at least one SAN-connected host system and communicates with a host bus adapter (HBA) device driver. Independent claim 1 requires providing a pass through in said HBA device driver for passing communications to a designated device in the storage area network from said SAN management application including at least one topology analysis command; said at least one topology analysis command including a command to get interconnect information and a command to get topology information; and providing said pass through includes providing at least a transport pass through and an extended link service (ELS) pass through; each of said transport pass through and said extended link service (ELS) pass through being a binary pass through, each taking applied commands and passing said commands to said designated device in the storage area network.

The present invention, as recited in independent claim 1 provides a novel storage area network (SAN) management and configuration method via enabling in-band communications that solves a problem of some existing SAN arrangements. A problem exists in some known storage area network arrangements, for example, in a

serial storage architecture (SSA), device driver writers and host based adapter (HBA) vendors provide a complex set of micro code calls. A management program would then interrogate the HBA, using micro code calls specific to the particular HBA vendor and model, then interpret the results in a way that is specific to that particular HBA vendor and model. One problem with this arrangement is that an in-depth understanding is needed for every HBA model of every vendor, which in the case of Fibre Channel, is impractical. There are too many vendors and too many models to implement this approach.

The subject matter of the invention, as recited in independent claim 1, is not rendered obvious from the total teaching of the references of record.

35 U.S.C. §103 requires that the invention as claimed be considered "as a whole" when considering whether the invention would have been obvious when it was made. Graham v. John Deere, 383 U.S. 1, 148 USPQ 459, 472 (1966). It is applicants' claimed invention which must be considered as a whole pursuant to 35 U.S.C. §103, and failure to consider the claimed invention as a whole is an error of law. In order for there to be a prima facie showing of obviousness under 35 U.S.C. §103, it is necessary that the references being combined in an attempt to demonstrate prima facie obviousness must themselves suggest the proposed combination. For a combination of prior art references to render an invention obvious, "[t]here must be some reason, suggestion, or motivation found in the prior art whereby a person of ordinary skill in the field of the invention would make the combination." In re Oetiker, 977 F.2d 1443, 1447, 24 USPQ2D 1443, 1446 (Fed. Cir. 1992). That one must point to some reason,

suggestion, or motivation to make a combination is not to say that the teaching must be explicit, but in order to render an invention obvious by the combination of prior art references, the prior art must contain some reason, suggestion, or motivation. It is impermissible to use the inventor's disclosure as a "road map" for selecting and combining prior art disclosures. In Interconnect Planning Corp. v. Feil 774 F.2d 1132, 1143, 227 USPQ 542, 551 (Fed. Cir. 1985), the Federal Circuit noted that "The invention must be viewed not with the blueprint drawn by the inventor, but in the state of the art that existed at the time."

To establish a prima facie case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. See MPEP §2143.

The present rejection of claims 1-4, 6, 10-14 and 15-18 under 35 USC §103(a) as being unpatentable over Kelman, U.S. patent 6,671,820 in view of Stai et al., U.S. patent 6,401,128 and further in view of Haren, U.S. patent 6,557,060, and further in view of newly cited Fredericks et al., U.S. patent 6,347,334 fails to establish at least the first and third criteria.

With respect to the first criteria, the Examiner argues that there is some

suggestion or motivation to combine the Kelman, Stai et al., Haren and Fredericks et al. references. Applicants respectfully submit that the rejections fail to meet this first criteria. Kelman discloses a system and method for preventing corruption of networked storage devices during backup data recovery. Stai et al. disclose a system and method for sending frames between a public device and a private device including a phantom device mapping, an address translation, a frame payload translation, and a CRC regeneration. Haren discloses a host expansion bridge where data is converted from a first granularity to a second granularity different from the first granularity. Fredericks et al. disclose a method for implementing a link level service in a computer network having a first port device and a second port device. Stai et al., Haren and Fredericks et al. do not discuss or even mention storage area network management and configuration. The references have no relation to one another, other than being related to computer or network communications.

The Examiner asserts that Kelman teaches the claimed limitations of utilizing a SAN management application for managing and configuring the storage area network; said SAN management application communicates with at least one SAN-connected host system and communicates with a host bus adapter (HBA) device driver; and providing a pass through in said HBA device driver for passing communications to a designated device in the storage area network from said SAN management application. The Examiner is simply wrong in these assertions.

The Examiner refers to Col. 3, line 51 -col. 4, line 2 and col.6, line 64 - col. 7, line 25 of Kelman in support of these assertions. The cited portions of Kelman are set forth

above.

Applicants respectfully submit that the total teachings of Kelman cannot be interpreted as being equivalent to or as suggesting the above steps recited in claim 1. The LUN masking driver of Kelman does not teach or suggest a host bus adapter (HBA) device driver as taught and claimed by Applicants. Applicants respectfully submit that Kelman does not teach or suggest providing a pass through in said HBA as taught and claimed by Applicants.

Only Applicants teach the above steps recited in claim 1. The above limitations of independent claim 1 are not shown nor suggested in total combination of teachings of Kelman, Stai et al., Haren and Fredericks et al. Thus, independent claim 1 is patentable.

The prior art of record, including Kelman, Stai et al., Haren and Fredericks et al., provides no teaching, suggestion or inference in the prior art as a whole or knowledge generally available to one having ordinary skill in the art to achieve the claimed invention. 35 U.S.C. § 103 requires that the invention as claimed be considered "as a whole" when considering whether the invention would have been obvious when it was made. Graham v. John Deere, 383 U.S. 1, 148 USPQ 459, 472 (1966). It is applicant's claimed invention which must be considered as a whole pursuant to 35 U.S.C. § 103, and failure to consider the claimed invention as a whole is an error of law.

In the words of the Court of Appeals for the Federal Circuit, "The mere fact that the prior art may be modified in the manner suggested by the Examiner does

not make the modification obvious unless the prior art suggested the desirability of the modification." In re John R. Fritch, 972 F.2d 1260, 1266, 23 USPQ2d 1780 (Fed. Cir. 1992). See In re Gordon and Sutherland, 733 F.2d 900, 221 USPQ 1125, 1127 (Fed. Cir. 1984), Carl Schenck, A.G. v. Nortron Corp., 713 F.2d 782, 787, 218 USPQ 698, 702 (Fed. Cir. 1983), and In re Sernaker, 702 F.2d 989, 995-96, 217 USPQ 1, 6-7 (Fed. Cir. 1983).

Applicant respectfully submits that the prior art description of Kelman, Stai et al., Haren and Fredericks et al. falls short of applicant's invention, and the subject matter of the claimed invention as recited in claim 1 would not have been obvious to one of ordinary skill in the art in view of the references of record. Further in the cited references, there is no hint of providing any pass through, as taught and claimed by Applicants. A combination of all the teachings of the references of record would not achieve the claimed invention as recited by claim 1.

Thus, independent claim 1 is patentable.

Claim 11 is patentable

Independent claim 11 is submitted to be patentable for the same reasons set forth above in connection with claim 1. Independent claim 11 recites a storage area network (SAN) management and configuration apparatus via enabling in-band communications comprising: a storage area network (SAN) management application for managing and configuring the storage area network; said SAN management application communicates with at least one SAN-connected host system; said SAN-connected host system including a management application agent for communicating with a host bus adapter (HBA) device driver; said HBA device driver for communicating with a designated device in the storage area network; said HBA device driver including at least one pass through service for passing a plurality of commands to said designated device in the storage area network; said commands including at least one topology analysis command; said at least one topology analysis command including a command to get interconnect information and a command to get topology information; said at least one pass through including a transport pass through and an extended link service (ELS) pass through; each of said transport pass through and said extended link service (ELS) pass through being a binary pass through, each taking applied commands and passing said commands to the designated device in the storage area network. The recited storage area network (SAN) management and configuration apparatus via enabling in-band communications of independent claim 11 is not shown, nor suggested, by the Kelman, Stai et al., Haren and Fredericks et al. references relied upon by the Examiner.

A combination of all the teachings of the references of record would not achieve the claimed invention as recited by claim 11.

The references of record do not suggest the HBA device driver for communicating with a designated device in the storage area network and including at least one pass through service for passing a plurality of commands to said designated device in the storage area network; said commands including at least one topology analysis command; said at least one topology analysis command including a command to get interconnect information and a command to get topology information, as taught and recited inc claim 11.

Kelman, Stai et al., Haren and Fredericks et al. fail to provide any suggestion of the HBA device driver, and further fail to provide any suggestion of the at least one pass through including a transport pass through and an extended link service (ELS) pass through; each of said transport pass through and said extended link service (ELS) pass through being a binary pass through, each taking applied commands and passing said commands to the designated device in the storage area network, as taught and recited inc claim 11.

Kelman, Stai et al., Haren and Fredericks et al. fail to suggest that each of said transport pass through and said extended link service (ELS) pass through being a binary pass through, each taking applied commands and passing said commands to the designated device in the storage area network, as taught and recited inc claim 11. The Examiner states that "Claims 11-14, 16 and 17 are rejected for similar reasons as stated above including claims 1, 6 and 10." The Examiner fails to cite any teaching or

motivation in the prior art to provide the claimed limitations "each of said transport pass through and said extended link service (ELS) pass through being a binary pass through, each taking applied commands and passing said commands to the designated device in the storage area network," as taught and recited inc claim 11. Kelman fails to teach or suggest any pass through in a HBA driver device. Stai et al. fail to teach or suggest any pass through in a HBA driver device. Haren fails to teach or suggest any pass through in a HBA driver device. Fredericks et al. fail to teach or suggest any pass through in a HBA driver device.

The references of record do not suggest the HBA device driver as recited by claim 11, and do not suggest the at least one pass through including a transport pass through and an extended link service (ELS) pass through; each of said transport pass through and said extended link service (ELS) pass through being a binary pass through, each taking applied commands and passing said commands to the designated device in the storage area network, as taught and recited inc claim 11. In Re Fritch 972 F.2d at 1266, 23 USPQ2d at 1780 (Fed. Cir. 1992), states: "[I]t is impermissible to use the claimed invention as an instruction manual or 'template' to piece together the teachings of the prior art so that the claimed invention is rendered obvious. ... This court has previously stated that '[o]ne cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claimed invention." Applicants respectfully submit that the total teaching of the Kelman, Stai et al., Haren and Fredericks et al. patents would not achieve the claimed invention as recited by claims 11.

Thus, independent claim 11 is patentable.

Claim 13 is patentable

Claim 13 is submitted to be patentable for the same reasons set forth above in connection with claim 11. Representative claim 13 is separately patentable further defining the invention of claim 11, reciting that the SAN-connected host system includes a fibre channel hierarchy and a HBA device driver interface and that the at least one pass through service bypasses said HBA device driver interface and a plurality of layers of said fibre channel hierarchy. This pass through service that bypasses said HBA device driver interface and a plurality of layers of said fibre channel hierarchy is neither disclosed nor suggested by any of the references of record, including Kelman, Stai et al., Haren and Fredericks et al.

Thus, claim 13 is separately patentable over the references of record.

D. THE REJECTION OF CLAIMS 8 and 9 AS BEING UNPATENTABLE OVER KELMAN, STAI et. al., HAREN, FREDERICKS et al., and IN FURTHER VIEW OF PANAS et al. SHOULD BE REVERSED

Claim 8 is patentable

Claim 8 is submitted to be patentable for the same reasons set forth above in connection with claim 1. Further representative claim 8 is separately patentable further defining the invention of claim 1 reciting that the step of providing said pass through in said host bus adapter (HBA) device driver includes providing said pass through for passing at least one performance analysis command. Only applicants teach providing

said pass through in a HBA device driver. The claimed pass through for passing at least one performance analysis command of claim 8 is not shown nor suggested in total combination of teachings of the references of record. This feature is neither disclosed nor suggested by the references of record, including Panas et al.

Panas et al. disclose a method for centralized and managed loading of boot images into one or more processors that are part of a file server for a mass storage system. Panas et al. do not teach or suggest a host bus adapter (HBA) device driver as taught and claimed by Applicants. Applicants respectfully submit that Panas et al. do not teach or suggest providing a pass through in said HBA as taught and claimed by Applicants. Thus, claim 8 is further patentable over the references of record.

Claim 9 is patentable

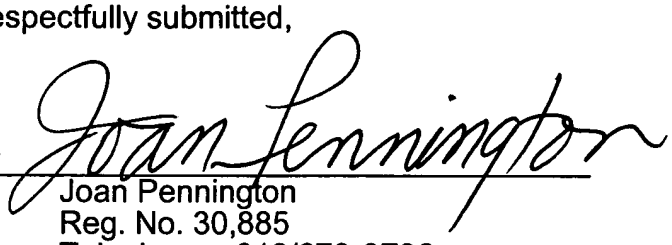
Claim 9 is submitted to be patentable for the same reasons set forth above in connection with claims 1 and 8. Further representative claim 9 is separately patentable further defining the invention of claim 1 reciting that the step of providing said pass through in said host bus adapter (HBA) device driver includes providing said pass through for passing at least one attribute analysis command. Only applicants teach providing said pass through in a HBA device driver. The claimed pass through for passing at least one attribute analysis command of claim 9 is not shown nor suggested in total combination of teachings of all the references of record. This feature is neither disclosed nor suggested by the references of record, including Panas et al. Thus, claim 9 is further patentable over the references of record.

E. CONCLUSION

Claims 1-4, 6, 10-14 and 15-18 are patentable over all the references of record and are not rendered obvious by the Kelman, Stai et al., Haren, Fredericks et al. and Panas et al. patents. Each of the claims 1-4, 6, 10-14 and 15-18 is patentable and the Examiner's rejections should be reversed.

It is respectfully requested that the final rejection be reversed.

Respectfully submitted,

By 

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(8) CLAIMS APPENDIX

CLAIMS ON APPEAL

1. A storage area network (SAN) management and configuration method via enabling in-band communications comprising the steps of:

utilizing a SAN management application for managing and configuring the storage area network; said SAN management application communicates with at least one SAN-connected host system and communicates with a host bus adapter (HBA) device driver, and

providing a pass through in said HBA device driver for passing communications to a designated device in the storage area network from said SAN management application including at least one topology analysis command; said at least one topology analysis command including a command to get interconnect information and a command to get topology information; and providing said pass through includes providing at least a transport pass through and an extended link service (ELS) pass through; each of said transport pass through and said extended link service (ELS) pass through being a binary pass through, each taking applied commands and passing said commands to said designated device in the storage area network.

2. A storage area network (SAN) management and configuration method as recited in claim 1 wherein the step of utilizing said SAN management application for communicating with a HBA device driver includes the step of providing a management application agent coupled between said SAN management application and said HBA device driver.

3. A storage area network (SAN) management and configuration method as recited in claim 2 includes the step of utilizing said management application agent for providing predefined, fibre channel protocol functions for communicating with said device in the storage area network.

4. A storage area network (SAN) management and configuration method as recited in claim 3 wherein the step of providing predefined protocol functions for communicating with said device in the storage area network include the step of providing a transport protocol function and an extended link service (ELS) protocol function.

5.

6. A storage area network (SAN) management and configuration method as recited in claim 1 wherein the step of providing said pass through in said host bus adapter (HBA) device driver for passing communications to a device in the storage area network from said SAN management application includes the step of providing said pass through for passing a plurality of commands.

7. (canceled)

8. A storage area network (SAN) management and configuration method as recited in claim 6 includes the step of providing said pass through for passing at least one performance analysis command.

9. A storage area network (SAN) management and configuration method as recited in claim 6 includes the step of providing said pass through for passing at least one attribute analysis command.

10. A storage area network (SAN) management and configuration method as recited in claim 6 includes the step of providing said pass through for passing at least one configuration command.

11. A storage area network (SAN) management and configuration apparatus via enabling in-band communications comprising:

a storage area network (SAN) management application for managing and configuring the storage area network; said SAN management application communicates with at least one SAN-connected host system;

said SAN-connected host system including a management application agent for communicating with a host bus adapter (HBA) device driver;

said HBA device driver for communicating with a designated device in the storage area network; said HBA device driver including at least one pass through service for passing a plurality of commands to said designated device in the storage area network; said commands including at least one topology analysis command; said at least one topology analysis command including a command to get interconnect information and a command to get topology information;

said at least one pass through including a transport pass through and an extended link service (ELS) pass through; each of said transport pass through and said extended link service (ELS) pass through being a binary pass through, each taking applied commands and passing said commands to the designated device in the storage area network.

12. A storage area network (SAN) management and configuration apparatus via enabling in-band communications as recited in claim 11 wherein SAN-connected host system includes a fibre channel hierarchy and a HBA device driver interface.

13. A storage area network (SAN) management and configuration apparatus via enabling in-band communications as recited in claim 12 wherein said at least one pass through service bypasses said HBA device driver interface and a plurality of layers of said fibre channel hierarchy.

14. A storage area network (SAN) management and configuration apparatus via enabling in-band communications as recited in claim 13 wherein said plurality of layers of said fibre channel hierarchy includes a small computer system interface (SCSI) protocol driver, an upper level protocol (UPL) mapping, and a common services layer.

15. A storage area network (SAN) management and configuration apparatus via enabling in-band communications as recited in claim 11 wherein said at least one pass through service for passing said plurality of commands to said designated device in the storage area network include at least one attribute analysis command.

16. A storage area network (SAN) management and configuration apparatus via enabling in-band communications as recited in claim 11 further includes at least one performance analysis command and at least one configuration command.

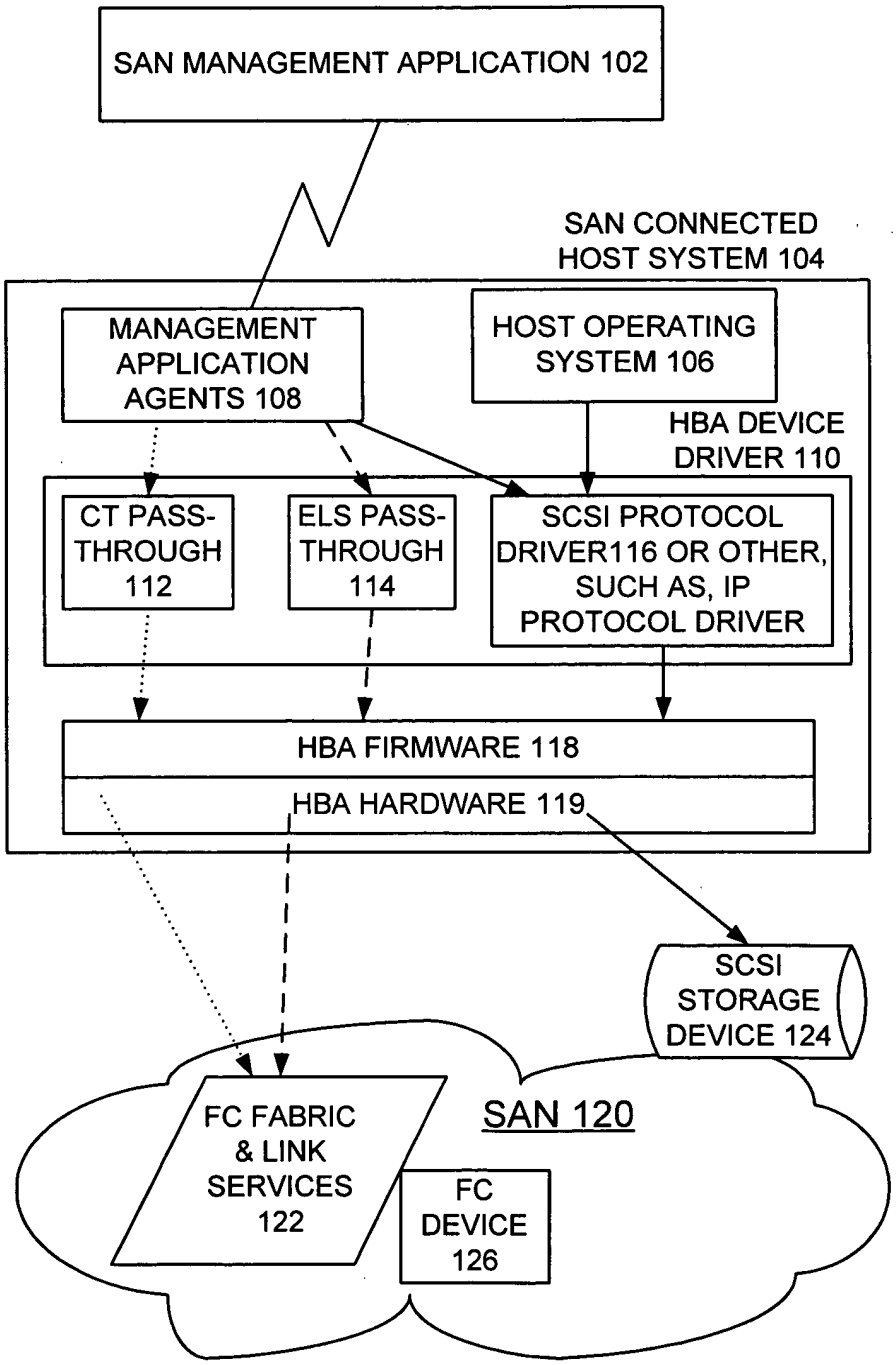
17. A storage area network (SAN) management and configuration apparatus via enabling in-band communications as recited in claim 11 wherein said management application agent provides predefined protocol functions for communicating with said

designated device in the storage area network; said predefined protocol functions including a transport protocol function passed to said designated device by said transport pass through.

18. A storage area network (SAN) management and configuration apparatus via enabling in-band communications as recited in claim 11 wherein said management application agent provides predefined protocol functions for communicating with said designated device in the storage area network; said predefined protocol functions including an extended link service (ELS) protocol function passed to said designated device by said extended link service (ELS) pass through.

(9) EVIDENCE APPENDIX
DRAWINGS OF INVENTION

FIG. 1



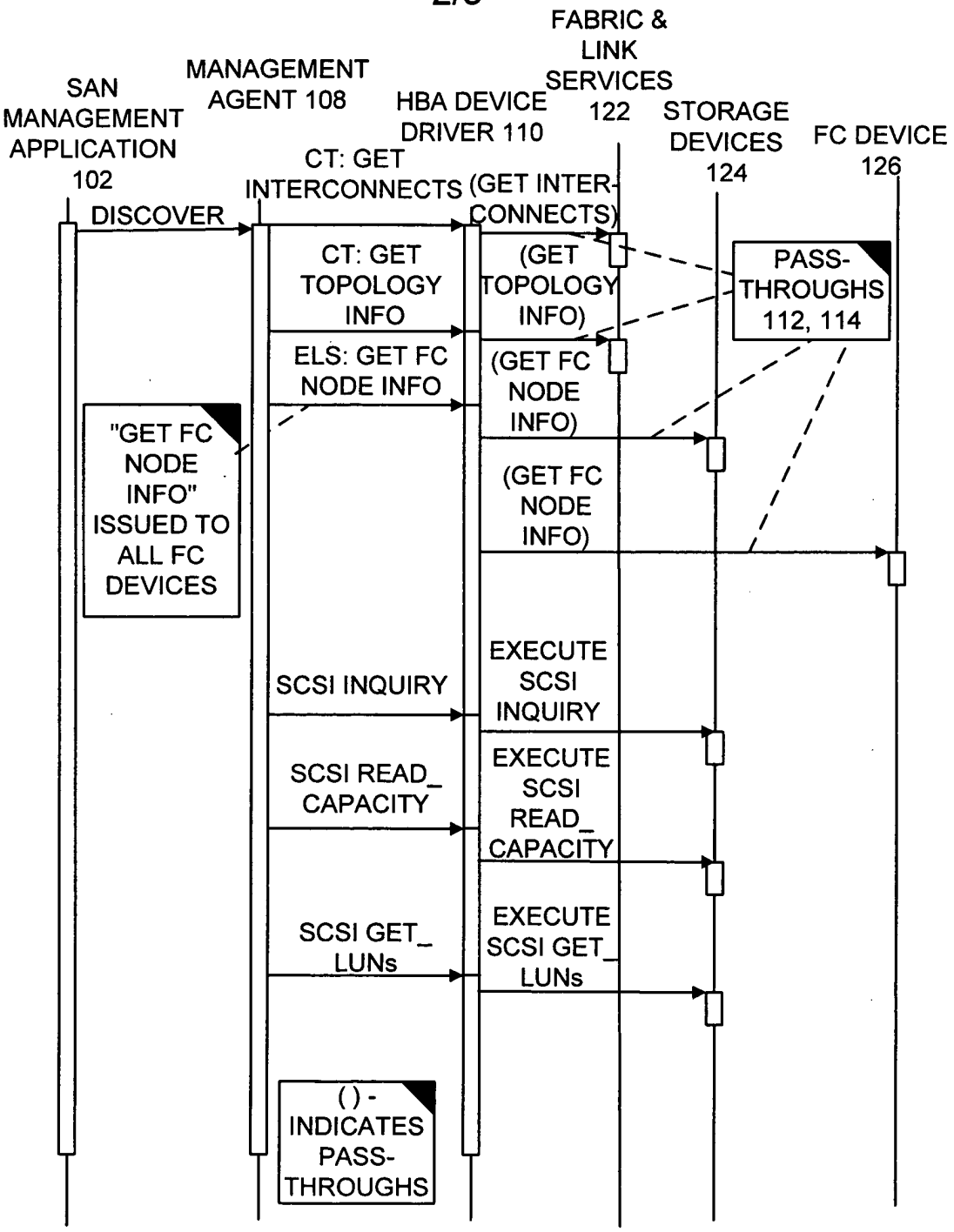
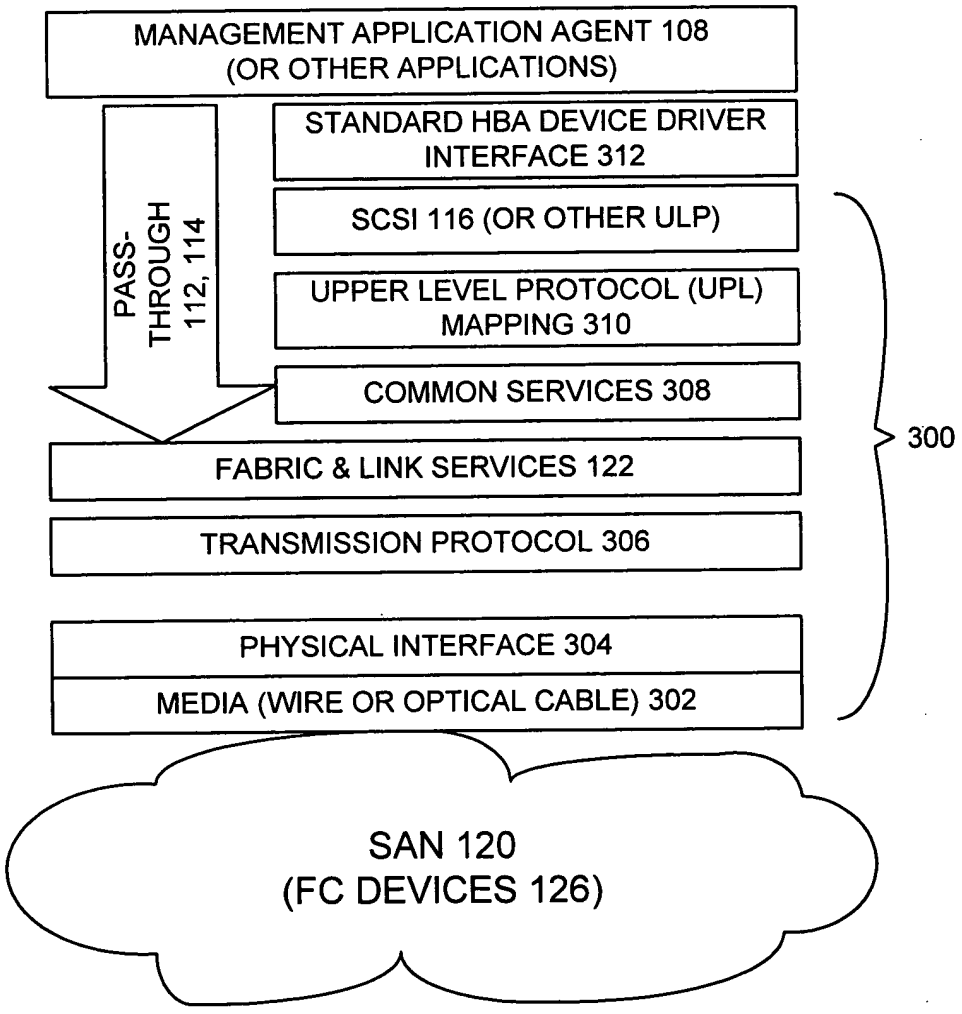


FIG. 2

FIG. 3



(10) RELATED PROCEEDINGS APPENDIX

None.